



THE UNIVERSITY OF BRITISH COLUMBIA
FACULTY OF APPLIED SCIENCE (Engineering)

2014 COURSE SYLLABUS

PROGRAM: Civil Engineering

COURSE: CIVL 498C - Life Cycle Assessment

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1. **Learning Objectives**

- Understand international standards and methods guiding life cycle assessment (LCA) studies.
- Identify major organizations involved in the development of LCA practice.
- Interpret and provide critical feedback on LCA studies and claims to sustainability.
- Operate whole building LCA software, Environmental Impact Estimator.
- Use LCA to inform low impact building designs and obtain recognition from standards.

2. **Detailed Course Outline**

- **History and Current State of LCA.** Public concerns and the development of LCA: Public concerns, Professional community, Database standards, Methodology development, Software tools and Education. Global efforts in LCA development: Athena Sustainable Materials Institute, CIRAI, UNEP/SETAC Life Cycle Initiative, International Organization for Standardization (ISO), ACLCA.
- **Structure of LCA.** Standards: foundational LCA standards (ISO 14040, 14044), environmental product declarations (EPDs) and product category rules (ISO 14025), Sustainability in building construction standards (ISO 15932, 21929, 21930, 21931-1). LCA Methodology: Goal and Scope, Inventory Analysis, Impact Assessment, Interpretation.
- **Development of a Whole Building LCA study.** LCA in Green Building: LEED v4, Green Globes, CalGreen, Living Building Challenge, International Green Construction Code, Global Reporting Initiative: Construction and Real Estate Sector Supplement. Life Cycle Stage considerations: Product, Construction Process, Use, End of Life. Modeling methods: Material takeoffs, Software use, Life cycle inventory databases, Impact assessment methods, Optional Elements and Benchmarking, Integrated analysis with life cycle costing (LCC).
- **Uncertainty in LCA.** Types of Uncertainty: Data uncertainty, model uncertainty, uncertainty due to choices, temporal variability, spatial variability, variability between objects and sources.

3. **Texts and Bibliography**

There is no required text for the course. Lecture notes and handouts will be provided in the classroom.

4. **Grade Distribution**

Course Participation & Feedback – 10%
Assignments – 30%
Quizzes – 10%
Final Project – 40%
Final Presentation – 10%